CAUSES OF FLASHY FLOODS AND MUD FLOWS IN UTAH[3]

The report of the Utah Flood Commission, of which C. L. Forsling and Reed Bailey, and R. J. Becraft of the Utah State Agricultural College are members, was forwarded to Governor Dern on December 30.

The commission concluded that the flashy floods and mud flows in Utah, although due directly to heavy torrential rains on steep slopes, were indirectly the result of sparseness of vegetation due in some cases to natural barrenness of semibarrenness of the watersheds, but in most cases to denudation by overgrazing, fire, and overcutting of timber, named in the descending order of their importance. The floods in Davis County, the worst in the State, were almost wholly the result of man-caused denudation. The floods originated on a relatively small area at the heads of the steep canyons where there has been very heavy overgrazing on privately owned land by both cattle and sheep.

The study revealed that similar rains have occurred in the past and probably will continue to occur at intervals of a few years to several decades, but there is no evidence of a similar frequency of floods. The geological evidence shows that the floods of 1923 and 1930 mark a distinct departure from the normal geological erosion that has been going on since Lake Bonneville receded to approximately the present level of Great Salt Lake, 20,000 years or more ago. The floods of 1923 and 1930 in places cut as great a depth in the Lake Bonneville deltas as had been cut in all the years since Lake Bonneville receded. Moreover, had erosion been going on since Lake Bonneville at a rate comparable to that during the recent floods there would have been huge alluvial fans several miles in length in front of the canyons, whereas these deposits are exceedingly small. Sand, gravel, and rocks, including bowlders up to 50 tons in weight, were deposited on rich farm lands, formerly lake bottom, where the original soil was a silt. Several facts relating to erosion and deposition on the shores of Lake Bonneville, formerly overlooked by geologists, were brought to light in the study.

PHYSICS OF THE EARTH—III. METEOROLOGY

Dr. J. S. Ames in 1926, as chairman of the Division of Physical Sciences of the National Research Council, was instrumental in organizing a large committee to prepare a series of bulletins on the Physics of the Earth, the purpose being "to give the reader, presumably a scientist but not a specialist on the subject, an idea of its present status together with a forward-looking summary of its outstanding problems."

Committees were formed to prepare reports on the following subjects:

The Figure of the Earth: Gravity, Deflection of the Vertical, and Isostacy; Tides, Oceans, and Earth, Variation of Latitude.

Seismology.

Terrestrial Magnetism.

The Age of the Earth.

Field Methods for Detecting Unhomogeneities in the Earth's Crust.

Internal Constitution of the Earth.

Meteorology.

Oceanography.

Volcanology.

This important project is now being realized by the appearance of the first, second, and third of the series of bulletins:

No. I treats of Volcanology.

No. II treats of the Figure of the Earth, and the present volume, No. III, the subject of this review, considers the Meteorology of the Globe. The volume consists, essentially, of a series of contributions by the members of the committee, prefaced by an introduction written by the chairman, Dr. Herbert H. Kimball, who also contributed Chapter III, Solar Radiation and its Rôle. Other committee members and their respective contributions are as follows:

Chapter I. The Atmosphere: Origin and Composition, by William J. Humphreys.

Chapter II. Meteorological Data and Meteorological Changes, by Alfred J. Henry.

Chapter III as before stated.

Chapter IV. The Meteorology of the Free Atmosphere, by Willis R. Gregg, L. T. Samuels, and W. R. Stevens.

Chapter V. Dynamic Meteorology, by Hurd C. Willitt.

Chapter VI. Physical basis of Weather Forecasting, by Richard Hanson Weightman.

The several bulletins may be purchased from the National Research Council, Constitution Avenue and Twenty-first Street, Washington, D. C.—*A. J. H.*

THE METEOROLOGY OF THE SEVENTH CRUISE OF THE "CARNEGIE[4]"

By J. H. PAUL

[Author's abstract]

An abbreviation of the usual magnetic investigations made it possible to undertake a complete meteorological program during Cruise VII of the nonmagnetic vessel *Carnegie*. In addition to the ordinary observations, a study of several special problems in atmospheric circulation over the oceans was initiated. Temperature and humidity lapse rates from quarter-deck to masthead were recorded automatically by a Hartmann and Braun electric-resistance multithermograph with three pairs of thermal elements (wet and dry) at various heights. Continuous thermograms of sea-surface temperature were obtained by a bulb-and-capillary recorder. Continuous humidity measurements were also obtained by a recording aspiration psychrometer of Negretti and Zambra manufacture for immediate use aboard and as a control on the multithermograph. These instruments were all intercompared with standard thermometers daily. A continuous record of atmospheric pressure was kept by an aneroid barograph which was daily checked by readings on standard mercurial barometers. In addition to these records, soundings of the upper air were made almost daily in the Pacific with hydrogen-inflated pilot balloons for direction and velocity of the air currents to great heights. Measurements of the rate of evaporation were carried out when conditions were favorable. Projected studies in total solar and sky radiation, although of great interest, had to be abandoned because of the difficulties encountered in working on a vessel with lofty sails and because of pressure of other work.

The great interest of meteorologists in the work of the *Carnegie* is due to the fact that she sailed in regions from which data is very scanty and was working with instruments whose accuracy is known, something one can not claim for the commercial vessels from which ocean observations are ordinarily obtained.

[3] Reprinted from Forest Service, Monthly Report of Research: December, 1930, pp. 12-13.

[4] Reprinted from Jour. Wash. Acad. Sciences, 21:46, Feb. 4, 1931.